

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

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1. (currently amended) A resonator comprising:
a columnar shielding case composed of a conductive material and defining an interior space; and
a dielectric made of a dielectric ceramic material substantially filling the entire interior space, the resonator using a resonant mode causing generation of a current crossing a corner of the columnar shielding case;
wherein the resonator using a TM mode, wherein the dielectric includes a center portion and an outer portion covering at least part of the center portion, and the dielectric constant of the center portion is higher than the dielectric constant of the outer portion.
 2. (cancelled)
 3. (previously presented) The resonator of Claim 1, wherein the columnar shielding case is in a shape of a cylinder or a square pole.
 4. (previously presented) The resonator of Claim 1, wherein the shielding case is a metallized layer formed on the surface of the dielectric.

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5. (original) The resonator of Claim 1, wherein the resonant mode is a TM mode.

6. (previously presented) A resonator using a TM mode, the resonator comprising:

a case composed of a case body and a lid;

a dielectric fixed therein;

an elastic layer sandwiched between the lid and the case body; and

a planar conductive foil sheet sandwiched between the elastic layer and the case body,

wherein lower and upper ends of the dielectric are respectively fixed to an inner face of a bottom of the case body and the conductive foil in contact therewith, and

the conductive foil sheet extends outwardly to the outer edge of the case, and is in electrical contact with the case body.

7. (previously presented) The resonator of Claim 6, wherein the conductive foil sheet is interposed between the case body and the lid, and the dielectric is electromagnetically shielded by the body and the conductive foil sheet.

8. (previously presented) The resonator of Claim 6, wherein the conductive foil sheet is interposed between the case body and the lid, and the dielectric is sandwiched between the body and the lid.

9. (previously presented) The resonator of Claim 7, further comprising an elastic layer interposed between the conductive foil sheet and the lid.

10. (original) The resonator of Claim 6, wherein the resonant mode of the resonator includes a TM mode.

11. (previously presented) A resonator comprising:
a dielectric having a hole;
a case surrounding the dielectric;
an elastic layer sandwiched between the lid and the case body;
a planar conductive foil sheet sandwiched between the elastic layer and the case body;
the dielectric having lower and upper ends that are respectively disposed in contact with an inner face of the case and the conductive foil sheet; and
a conductor rod inserted into the hole of the dielectric, the insertion depth of the conductor rod being variable,
wherein a resonant frequency is adjusted with the insertion depth of the conductor rod into the hole, and
the conductive foil sheet extends outwardly to the outer edge of the case, and is in electrical contact with the case body.

12. (previously presented) A radio frequency filter comprising:

a case body and a lid respectively composed of a conductive material;
an elastic layer sandwiched between the lid and the case body;
a planar conductive foil sheet sandwiched between the elastic layer and the case body;
a dielectric fixed therein and in contact with said conductive foil sheet, wherein a coaxial connector is placed on an outer surface of the case body,
a center conductor of the coaxial connector extends through an inner portion of the case body,
one end of a conductor probe is connected to the center conductor, and
another end of the conductor probe is connected to the conductive foil sheet.

13. (currently amended) A radio frequency filter having a columnar resonator using a resonant mode causing generation of a current crossing a corner, the resonator comprising:

a dielectric made of a dielectric ceramic material having top and bottom surfaces and at least one side surface; and

a shielding conductor surrounding the dielectric formed in direct contact with the top, bottom and side surface of the dielectric;

wherein the resonator using a TM mode wherein the dielectric includes a center portion and an outer portion covering at least part of the center portion, and the dielectric constant of the center portion is higher than the dielectric constant of the outer portion.

14. (currently amended) A radio frequency filter having a resonator using a TM mode, the resonator comprising:

- a case composed of a case body and a lid;
- a dielectric fixed therein;
- a case for housing the dielectric;
- an elastic layer sandwiched between the lid and the case body; and
- a planar conductive foil sheet sandwiched between the elastic layer and the case body,

wherein lower and upper ends of the dielectric are respectively fixed to an inner face of a bottom of the case body and the conductive foil in contact therewith, and part of the case is constructed of conductive foil and the conductive foil partly shields the dielectric electromagnetically, and

the conductive foil sheet extends outwardly to the outer edge of the case, and is in electrical contact with the case body.

15. (previously presented) A radio frequency filter having a resonator, the resonator comprising:

- a dielectric having a hole;
- a case surrounding the dielectric;
- an elastic layer sandwiched between the lid and the case body;
- a planar conductive foil sheet sandwiched between the elastic layer and the case body;

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and

a conductor rod inserted into the hole of the dielectric, the insertion depth of the conductor rod being variable,

wherein a resonant frequency is adjusted with the insertion depth of the conductor rod into the hole.

16. (previously presented) A radio frequency filter having a plurality of resonators at least including an input-stage resonator having a dielectric and receiving a radio frequency signal from an external device and an output-stage resonator having a dielectric and outputting a radio frequency signal to an external device, the radio frequency filter comprising:

a case surrounding the plurality of resonators for electromagnetically shielding the respective resonators,

wherein each of the input-stage resonator and the output-stage resonator comprise:

- (a) a case body and a lid;
 - (b) a dielectric fixed therein;
 - (c) an elastic layer which is sandwiched between the lid and the case body;
- and
- (d) a planar conductive foil sheet which is sandwiched between the elastic layer and the case body,

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(e) wherein lower and upper ends of the dielectric are respectively fixed to an inner face of the bottom of the case body and the conductive foil in contact therewith, a partition formed between resonators of which electromagnetic fields are coupled with each other among the plurality of resonators; an input-stage coupling window formed at the partition; and an input-stage coupling degree adjusting member made of a conductor rod for adjusting the area of the inter-stage coupling window.
